



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FNTYA109WO	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/JP2006/305904	International filing date (<i>day/month/year</i>) 17.03.2006	Priority date (<i>day/month/year</i>) 18.03.2005	
International Patent Classification (IPC) or national classification and IPC INV. F02D41/00			
Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> <i>sent to the applicant and to the International Bureau</i> a total of <u>7</u> sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 2006-11-02		Date of completion of this report 01.06.2007	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Marsano, Flavio Telephone No. +49 89 2399-8334 <div style="text-align: right;">  </div>	

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/JP2006/305904

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-38 as originally filed

Claims, Numbers

1-21 filed with telefax on 18.04.2007

Drawings, Sheets

1/9-9/9 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/JP2006/305904

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-21</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-21</u>
Industrial applicability (IA)	Yes: Claims	<u>1-21</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.) The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: US 2002/096137 A1

D3: US2004/0173013 A

2.) Document D1 discloses a motor vehicle (see D1, figs.5,6 and pars.116-122) having the following features drafted in independent claims 1, 11, 20 and 21 of the present application:

- an internal combustion engine;
- a fuel tank that stores a fuel, which is to be combusted by the internal combustion engine;
- an accumulator unit that accumulates electrical energy therein;
- a measurement unit that measures a state of charge of the accumulator unit;
- *a pressure regulation mechanism* functioning as a negative-pressure introducing pressure introducing source which receives a supply of electrical energy from the accumulator unit and regulates an internal pressure of the fuel tank with the received supply of electrical energy; and
- a pressure regulation control module that controls the regulation of the internal pressure of the fuel tank by *the pressure regulation mechanism*, based on the state of charge of the accumulator unit (see steps 217-219b) measured by the measurement unit on a start of or in the course of the pressure regulation *the pressure regulation mechanism*.

The device of D1 is different from the one of the present application in that *the pressure regulation mechanism is not an electric pump*.

D3 further discloses (figs.4-11 and pargs.37-48, 69-86) a motor vehicle as in claim 1 wherein the fuel vapor system can be pressurised/depressurised by a pump which is controlled by a motor drive which can changed the pump carachteristisc according to the battery capacity/voltage.

The skilled person would regard it as a normal design option to include this feature of D3 in the device described in document D1 in order to solve the problem of regulating tank fuel pressure with an electric pump based on the battery capacity.

Therefore the subject-matter of claims 1, 11 20 and 21 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).

3) Document D1 (see D1, figs.5,6 and pars.116-122) also discloses the additional features present in dependent claims 2-6,12-19.

Document D3 (figs.4-11 and pargs.37-48, 69-86) also discloses the additional features present in dependent claims 7-10.

Therefore, claims 2-19 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to inventive activity.

1

CLAIMS (Amendment under PCT Article 34)

1. (Currently amended) A motor vehicle, comprising:
an internal combustion engine;

a fuel tank that stores a fuel, which is to be combusted
5 by the internal combustion engine;

an accumulator unit that accumulates electrical energy
therein;

a measurement unit that measures a state of charge of the
accumulator unit;

10 an electrical pump functioning as a negative-pressure
introducing source which receives a supply of electrical energy
from the accumulator unit and regulates an internal pressure
of the fuel tank with the received supply of electrical energy;
and

15 a pressure regulation control module that controls the
regulation of the internal pressure of the fuel tank by the
electrical pump, based on the state of charge of the accumulator
unit measured by the measurement unit on a start of or in the
course of the pressure regulation by the electrical pump.

20 2. (Currently amended) A motor vehicle in accordance with
claim 1, wherein said pressure regulation control module
controls the pressure regulation by the electrical pump, in
order to keep the state of charge of the accumulator unit higher
than a preset low charge state.

25 3. (Currently amended) A motor vehicle in accordance with
claim 1, wherein said pressure regulation control module

controls the pressure regulation by the electrical pump, in order to apply a negative pressure into the fuel tank at a time of supply of the fuel to the fuel tank.

4. (Currently amended) A motor vehicle in accordance with
5 claim 1, wherein said pressure regulation control module controls the pressure regulation by the electrical pump, in order to apply a negative pressure into the fuel tank when said motor vehicle stops in an undrivable state for a preset long time period.

10 5. A motor vehicle in accordance with claim 1, wherein the state of charge of the accumulator unit represents a voltage level of the accumulator unit, and

the measurement unit comprises a voltage sensor that measures the voltage level of the accumulator unit.

15 6. A motor vehicle in accordance with claim 2, wherein the preset low charge state represents a low charge level that does not make said motor vehicle in a drivable state on a start of said motor vehicle.

20 7. (Currently amended) A motor vehicle in accordance with claim 2, wherein when the state of charge of the accumulator unit measured by the measurement unit decreases below a preset alert charge state, which is higher than the preset low charge state, said pressure regulation control module lowers the electrical energy supplied from the accumulator unit to the
25 electrical pump and controls the electrical pump to regulate the internal pressure of the fuel tank with the lowered supply

of electrical energy.

8. A motor vehicle in accordance with claim 7, wherein the preset alert charge state represents a total state of charge as a sum of the preset low charge state and an amount of
5 electrical energy required for the regulation of the internal pressure of the fuel tank.

9. (Currently amended) A motor vehicle in accordance with claim 2, wherein when the state of charge of the accumulator unit measured by the measurement unit decreases below a preset
10 alert charge state, which is higher than the preset low charge state, or decreases to the preset low charge state, said pressure regulation control module controls the electrical pump to stop the pressure regulation.

10. A motor vehicle in accordance with claim 9, wherein
15 the preset alert charge state represents a total state of charge as a sum of the preset low charge state and an amount of electrical energy required for the regulation of the internal pressure of the fuel tank.

11. (Currently amended) A motor vehicle, comprising:
20 an internal combustion engine;
a fuel tank that stores a fuel, which is to be combusted by the internal combustion engine;
an accumulator unit that accumulates electrical energy therein;
25 a measurement unit that measures a state of charge of the accumulator unit;

an electrical pump functioning as a negative-pressure
introducing source which receives a supply of electrical energy
from the accumulator unit and regulates an internal pressure
of the fuel tank with the received supply of electrical energy;

5 a charging system that is capable of charging the
accumulator unit; and

a pressure regulation control module that controls the
regulation of the internal pressure of the fuel tank by the
electrical pump and the charging of the accumulator unit by
10 the charging system, based on the state of charge of the
accumulator unit measured by the measurement unit on a start
of or in the course of the pressure regulation by the electrical
pump.

12. A motor vehicle in accordance with claim 11, wherein
15 the charging system comprises a high-voltage power source used
to drive said motor vehicle, and

the accumulator unit comprises a low-voltage power
source.

13. (Currently amended) A motor vehicle in accordance
20 with claim 11, wherein said pressure regulation control module
controls the pressure regulation by the electrical pump and
the charging of the accumulator unit by the charging system,
in order to keep the state of charge of the accumulator unit
higher than a preset low charge state, on termination of the
25 pressure regulation by the electrical pump.

14. (Currently amended) A motor vehicle in accordance

with claim 13, wherein when there is a possibility that the state of charge of the accumulator unit decreases to or below the preset low charge state, said pressure regulation control module controls the electrical pump and the charging system to regulate the internal pressure of the fuel tank simultaneously with charging the accumulator unit.

15. (Currently amended) A motor vehicle in accordance with claim 13, wherein when there is a possibility that the state of charge of the accumulator unit decreases to or below the preset low charge state, said pressure regulation control module controls the electrical pump and the charging system to interrupt the pressure regulation, start charging the accumulator unit, and allow resumption of the pressure regulation after completion of the charging.

16. A motor vehicle in accordance with claim 13, wherein the preset low charge state represents a low charge level that does not make said motor vehicle in a drivable state on a start of said motor vehicle.

17. (Currently amended) A motor vehicle in accordance with claim 11, wherein said pressure regulation control module controls the pressure regulation by the electrical pump, in order to apply a negative pressure into the fuel tank at a time of supply of the fuel to the fuel tank.

18. (Currently amended) A motor vehicle in accordance with claim 11, wherein said pressure regulation control module controls the pressure regulation by the electrical pump, in

order to apply a negative pressure into the fuel tank when said motor vehicle stops in an undrivable state for a preset long time period.

19. A motor vehicle in accordance with claim 11, wherein
5 the state of charge of the accumulator unit represents a voltage level of the accumulator unit, and

the measurement unit comprises a voltage sensor that measures the voltage level of the accumulator unit.

20. (Currently amended) A control method of a motor
10 vehicle, said motor vehicle being equipped with a fuel tank that stores a fuel; an accumulator unit that is charged with electric power and discharges electric power; and an electrical pump functioning as a negative-pressure introducing source which receives a supply of electric power from the accumulator
15 unit and regulates an internal pressure of the fuel tank with the received supply of electric power,

said control method comprising the steps of:

(a) measuring a state of charge of the accumulator unit
on a start of or in the course of the regulation of the internal
20 pressure of the fuel tank by the electrical pump; and

(b) controlling the regulation of the internal pressure of the fuel tank by the electrical pump, based on the state of charge of the accumulator unit measured in said step (a).

21. (Currently amended) A control method of a motor
25 vehicle, said motor vehicle being equipped with a fuel tank that stores a fuel; an accumulator unit that is charged with

electric power and discharges electric power; an electrical
pump functioning as a negative-pressure introducing source
which receives a supply of electric power from the accumulator
unit and regulates an internal pressure of the fuel tank with
5 the received supply of electric power; and a charging system
that is capable of charging the accumulator unit,

said control method comprising the steps of:

(a) measuring a state of charge of the accumulator unit
on a start of or in the course of the regulation of the internal
10 pressure of the fuel tank by the electrical pump; and

(b) controlling the regulation of the internal pressure
of the fuel tank by the electrical pump and the charging of
the accumulator unit by the charging system, based on the state
of charge of the accumulator unit measured in said step (a).